

Application Number 10/572761
Response to the Office Action dated 12/28/2007

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Amendments to the Specification:

This listing of specification will replace all prior versions of the corresponding paragraphs of the specification in the application.

Listing of Amended Paragraphs of Specification

Please amend the Brief Description of Drawings in paragraph [0011] beginning at page 5 of a clean copy of the preliminary amendment of the specification submitted on March 21, 2006 to read as follows:

Brief Description of Drawings

[0011] [FIG. 1] FIG. 1 is a cross-sectional view of a light-emitting element according to Embodiment 1 of the present invention.

[FIG. 2] FIG. 2 is a view for explaining a manufacturing process of the light-emitting element according to Embodiment 1 of the present invention.

[FIG. 3] FIG. 3 is a view for explaining a manufacturing process of the light-emitting element according to Embodiment 1 of the present invention.

[FIG. 4] FIG. 4 is a view for explaining a manufacturing process of the light-emitting element according to Embodiment 1 of the present invention.

[FIG. 5] FIG. 5 is a view for explaining a manufacturing process of the light-emitting element according to Embodiment 1 of the present invention.

[FIG. 6] FIG. 6 is a schematic enlarged cross-sectional view of a porous light-emitting layer according to Embodiment 1 of the present invention.

[FIG. 7] FIG. 7 is a cross-sectional view of a light-emitting element according to Embodiment 2 of the present invention.

[FIG. 8] FIG. 8 is a cross-sectional view of a light-emitting element according to Embodiment 3 of the present invention.

[FIG. 9] FIG. 9 is a cross-sectional view of a light-emitting element according to Embodiment 4 of the present invention.

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[FIG. 10] FIG. 10 is a view for explaining a manufacturing process of the light-emitting element according to Embodiment 4 of the present invention.

[FIG. 11] FIG. 11 is a view for explaining a manufacturing process of the light-emitting element according to Embodiment 4 of the present invention.

[FIG. 12] FIG. 12 is a view for explaining a manufacturing process of the light-emitting element according to Embodiment 4 of the present invention.

[FIG. 13] FIG. 13 is a view for explaining a manufacturing process of the light-emitting element according to Embodiment 4 of the present invention.

[FIG. 14] FIG. 14 is a schematic enlarged cross-sectional view of a porous light-emitting layer according to Embodiment 5 of the present invention.

[FIG. 15] FIG. 15 is a schematic enlarged cross-sectional view of a porous light-emitting layer according to Embodiment 5 of the present invention.

[FIG. 16] FIG. 16 is an exploded perspective view of a light-emitting element according to Embodiment 6 of the present invention.

[FIG. 17] FIG. 17 is a view for explaining effects of light emission according to Embodiment 1 of the present invention.

[FIG. 18] FIG. 18 is a cross-sectional view of a light-emitting element according to Embodiment 7 of the present invention.

[FIG. 19] FIG. 19 is a cross-sectional view of a light-emitting element according to Embodiment 8 of the present invention.

[FIG. 20] FIG. 20 is a cross-sectional view of a conventional light-emitting element in Non-patent document 2.

[FIG. 21] FIG. 21 is a cross-sectional view of a conventional light-emitting element in Patent document 3.

[FIG. 22] FIG. 22 is a cross-sectional view of a light-emitting element according to Embodiment 9 of the present invention.

[FIG. 23] FIG. 23 is a cross-sectional view of a light-emitting element according to Embodiment 10 of the present invention.

[FIG. 24] FIG. 24 is a cross-sectional view of a light-emitting element according to Embodiment 11 of the present invention.

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[FIG. 25] FIG. 25 is a cross-sectional view of a light-emitting element according to Embodiment 12 of the present invention.

[FIG. 26] FIG. 26 is a cross-sectional view of a light-emitting element according to Embodiment 13 of the present invention.

[FIG. 27] FIG. 27 is a cross-sectional view of a light-emitting element according to Embodiment 14 of the present invention.

[FIG. 28] FIG. 28 is a cross-sectional view of a light-emitting element according to Embodiment 15 of the present invention.

[FIG. 29] FIG. 29 is a cross-sectional view of a light-emitting element according to Embodiment 16 of the present invention.

[FIG. 30] FIGs. 30A to 30F are cross-sectional views for explaining processes of a manufacturing method of the light-emitting element shown in FIG. 29.

[FIG. 31] FIG. 31 is a cross-sectional view of a light-emitting element according to Embodiment 17 of the present invention.

[FIG. 32] FIGs. 32A to 32G are cross-sectional views for explaining processes of a manufacturing method of the light-emitting element shown in FIG. 31.

[FIG. 33] FIG. 33 is a cross-sectional view of a light-emitting element according to Embodiment 18 of the present invention.

[FIG. 34] FIGs. 34A to 34C are cross-sectional views for explaining processes of a manufacturing method of the light-emitting element shown in FIG. 33.

[FIG. 35] FIG. 35 is a cross-sectional view of a light-emitting element according to Embodiment 19 of the present invention.

[FIG. 36] FIGs. 36A to 36D are cross-sectional views for explaining processes of a manufacturing method of the light-emitting element shown in FIG. 35.

[FIG. 37] FIGs. 37A to 37C are cross-sectional views for explaining processes of a manufacturing method of an electron-emitting body according to Embodiment 20 of the present invention.

[FIG. 38] FIG. 38 is a cross-sectional view of a porous light-emitting body constituting a light-emitting element according to Embodiment 21 of the present invention.

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[FIG. 39] FIG. 39 is a cross-sectional view of a porous light-emitting body constituting the light-emitting element according to Embodiment 21 of the present invention.

[FIG. 40] FIG. 40 is a cross-sectional view of a porous light-emitting body constituting the light-emitting element according to Embodiment 21 of the present invention.

[FIG. 41] FIG. 41 is a schematic cross-sectional view of a porous light-emitting body constituting the light-emitting element according to Embodiment 21 of the present invention.

[FIG. 42] FIG. 42 is a schematic cross-sectional view of a porous light-emitting body constituting the light-emitting element according to Embodiment 21 of the present invention.

[FIG. 43] FIG. 43 is an exploded perspective view of main portions of a field emission display according to Embodiment 22 of the present invention.

[FIG. 44] FIG. 44 is a cross-sectional view of a light-emitting element array according to Embodiment 22 of the present invention.

[FIG. 45] FIGS. 45A to 45C are cross-sectional views of a light-emitting element array according to Embodiment 23 of the present invention.

Explanation of Characters in Figures Listed Above

- 1 Light-emitting element
- 2 Porous light-emitting layer
- 3 Phosphor particle
- 4 Insulating layer
- 5 Substrate
- 6 First electrode
- 7 Second electrode
- 8 Transparent substrate
- 9 Gap (gas layer)
- 10 Dielectric layer

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11 Partition wall
12 Space
15 Side wall
18 Insulative fiber
21 Address electrode
22 Display electrode
23a, 23b Rib
24 Primary electron
25 Secondary electron

70 Third electrode
100 Triangular pyramid Spindt-type emitter
111 Anode electrode
112 Cathode electrode
113 Gate electrode
116 Insulating layer
117 Substrate
118 Al₂O₃ layer
119 Electron-emitting body
125 Carbon nanotube
127 Vertically oriented carbon nanotube
130 Gap
131 PdO ultrafine particle film
132 Pt electrode
141 Metal thin film electrode
143 Substrate
145 Polysilicon
147 Silicon microcrystal
155 Organic metal complex gas
157 Whisker emitter

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170 Field emission display

171 Gate line

172 Cathode line

173 Anode substrate

174 Cathode substrate

175 Spacer

31 PZT ceramic

32 Flat electrode

33 Lattice electrode

34 Platinum electrode

35 Grid electrode

36 Vacuum vessel

37 Air outlet

41 Ferroelectric thin film

42 Lower electrode

43 Upper electrode

44 Light-emitting layer

45 Substrate

46 Transparent electrode

47 Opening portion

48 Carrier intensifying layer

Please amend paragraph [0239] beginning at page 75 to read as follows:

[0239] (Embodiment 17)

A light-emitting element including an electron-emitting body, a porous light-emitting body, and a pair of electrodes according to the present embodiment will be described with reference to FIGs. 31 and 32A to 32G. In the light-emitting element of the present embodiment, the porous light-emitting body includes inorganic phosphor particles 3 and

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is arranged adjacent to the electron-emitting body so as to be irradiated with electrons generated from the electron-emitting body, and a pair of the electrodes are arranged so that an electric field is applied to at least a part of the porous light-emitting body. In particular, the electron-emitting body includes a cathode electrode 112, a gate electrode 111, and a carbon nanotube 125 interposed between the two electrodes, and electrons emitted from the carbon nanotube 125 by the application of a gate voltage between the cathode electrode 112 and the gate electrode 111 are irradiated to the porous light-emitting body, whereby the porous light-emitting body is allowed to emit light.